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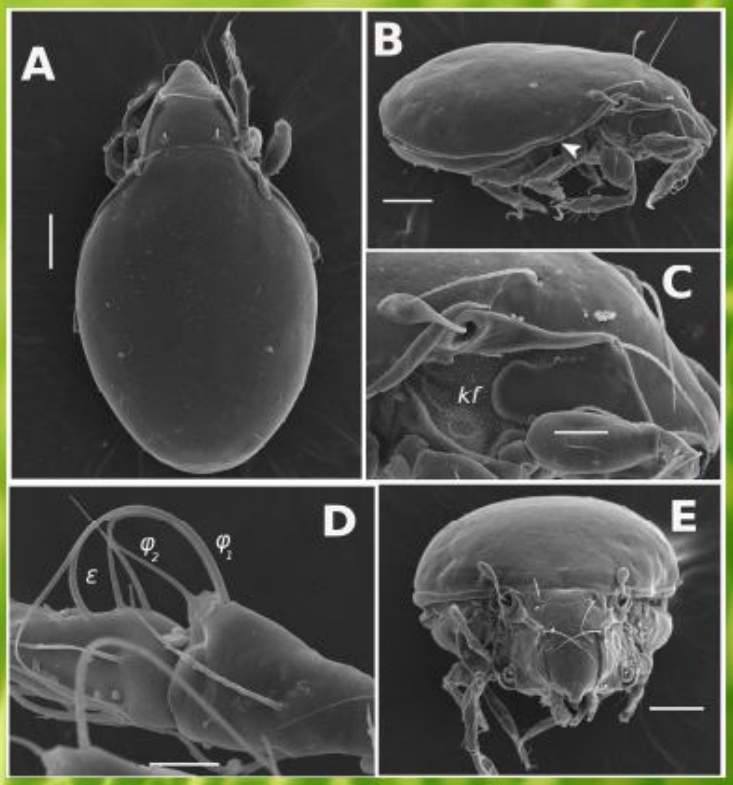

Hemileus suramericanus (Hammer, 1958) (adult)
Photo by Fredes & Martínez (See inside)

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Article

Redescription of *Hemileius suramericanus* (Acari, Oribatida, Scheloribatidae) with comments about Neotropical congeneric species

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Abstract

This paper represents the first redescription of *Hemileius suramericanus* (Hammer, 1958) (Oribatida, Scheloribatidae). Morphological and chaetotactic details are added to original Hammer's description. The species is compared with others Neotropical species of *Hemileius* and two new synonyms, *H. laticlava* and *H. confundatus sensu* Hammer, are proposed.

Keywords: Morphology, chaetotaxy, Neotropical species, Argentina, new synonyms.

Introduction

The knowledge of oribatid mites from South America was increased greatly with Mary Hammer's contributions (Hammer 1958; 1961; 1962a, b). Her investigations were carried out along the Andes Mountain in Argentina, Chile, Peru and Bolivia. In these works, about 300 new species of oribatid mites were described, but they were, in many cases, very short and uncompleted descriptions and focused mainly on dorsal and ventral characters of the adults, seldom analyzing lateral aspect, legs and palp chaetotaxy or gnathosoma. Among the species of South America, Hammer described several members of Scheloribatidae and particularly some species currently considered as *Hemileius*, such as *Hemileius suramericanus*.

The genus *Hemileius* was proposed by Berlese in 1916 with *H. initialis* (Berlese, 1908) as type species. In Neotropical region, it also been recorded *H. proximus* (Berlese, 1916), *H. initialis* (cited by Accattoli (2013)) and recorded by Hammer (1961, 1962a) as *Hemileius confundatus* (Sellnick, 1928), *H. trichosus* (Hammer, 1958) (also cited by Accattoli *et al.* (2010)), *H. muscicola* (Hammer, 1961), *H. microclava* (Hammer, 1961), *H. major* (Mahunka, 1985) and *H. laticlava* (Pérez-Iñigo & Baggio 1991). But morphological differences among some of them are very slight.

In Hammer's original description (1958), this species appeared as *Oribatula (?Hemileius) suramericana*; the author highlighted the presence of setae *ro* unilaterally ciliated, lamellae formed by two cross-linked border, sensilla with club-like head and short peduncle and presence of a double contour in the dorsosejugal suture. Balogh & Csiszár (1963) found it in El Bolsón, Río Negro, Argentina and cited it as *Hemileius suramericanus*. Recently, Fredes & Martínez (2010) analyzed reproductive aspects and body size variation of a population of *H. suramericanus* from soil of a native forest in Buenos Aires.

Hemileius suramericanus represents a very abundant species in soils of Buenos Aires, recording in densities ranging from 7500 to 10000 ind./m^2 (Fredes & Martínez

2010). The aim of this paper is to redescribe *H. suramericanus*, contributing with morphological aspects to a reliable identification. Taxonomical revision of Neotropical *Hemileius* species and comparison with *H. suramericanus* are discussed.

Materials & methods

Specimens were collected in "Nahuel Rucá" farm, Mar Chiquita district (37° 37' 10.35" S, 57° 25' 18.34" W), Buenos Aires, Argentina, July 2008. Samples were kept in Berlese funnels during 12 days; specimens were determinated with microscope Olympus CX31. Sketches were performed with a drawing tube and were processed in software Gimp 2.8. Selected specimens were mounted in a stub of aluminum, sputter-coated with gold (100 Å thick) for one minute and observed in electronic microscope JSM 6460LV (JEOL). The morphological terminology follows that of F. Grandjean (Travé & Vachon 1975).

Results

Scheloribatidae Grandjean, 1933
Hemileius Berlese, 1916
Hemileius suramericanus (Hammer, 1958)

Integument. Adult individuals pale yellowish to brown in color, integument smooth with pits in the anterior region of notogaster; cerotegument only in podosomatic and bothridial regions.
Adult size (n= 40). Female length= 335–417 μm (mean= 374); width= 189–277 μm (mean= 231). Male length= 308–395 μm (mean= 350); width= 172–266 μm (mean 208).
Prodorsum. Rostrum rounded, ending in a delicate hook in lateral view; setae *ro*, *le* and *in* setiform smooth; presence of a slightly visible line before setae *in* (Fig. 3A); sensilla club-shaped with a short peduncle and scarce barbs; lamellar system fully developed formed by lamellae, sublamellae and prolamellae; lamellae thin and marginal; sublamellae thinner than lamellae; prolamellae as thick as sublamellae, reaching setae *ro* insertion, continuing until the border of the camerostome (Fig. 1C); carinae *kf* present; setae *ex* setiform and tiny; porose areas *Al* absent.
Gnathosoma. Subcapitulum diarthric; chelicerae normal; setae *cha* and *chb* located as in *H. initialis*. Palp formula: 0-2-1-3-8(+1ω); setae *vt* present; eupathidic setae not arranged in a plane.
Notogaster. Oval in shape (Fig. 1A); anterior margin of notogaster quasi-straight, with an humeral border formed by a fold of notogastral shield, projecting beyond the level of acetabula III (Fig. 3A, 3C) and stretching after this level (Fig. 3B, white arrow). This kind of border has been described previously in *H. initialis* (Grandjean, 1953); ten pairs of smooth and setiform setae; four pairs of sacculi located as in *Dometorina*; lyrifissures *im* oblique, lyrifissures *ia* and *ip* undetectable. Anterior and posterior region with a series of sigillae, located as shown in Fig. 1A.
Ventral region. Epimeral region with a pattern of irregular sigillae; pedotecta I and II well developed, being the last one scale-shaped (Figs. 1B, 1C); epimeral formula 3-1-3-3, setae *1c* observable in lateral view; circumpedal carinae present; ventral plate smooth; lyrifissures *iad* located lateral to anterior part of anal plates; 4 pairs of genital setae, 1 pair of aggenital, 2 pairs of anal and 3 pairs of adanal setae located as shown in Fig. 1B.

Legs. Tarsi tridactylous; femora with sigillae in paraxial face; presence of porose areas in all tibiae and tarsi; solenidia of tibiae I and II arising from an anterior protuberance (Fig. 2A, 2B); all tarsi with a notorious lyrifissures *ly* (Figs. 2A–D). Setation: I (1-5-3-4-18+1); II (1-5-2-4-15); III (2-3-1-3-15); IV (1-2-1-3-12); solenidia: I (1-2-2); II (1-1-2); III (1-1-0); IV (1-1-0).
Immature. Unknown.

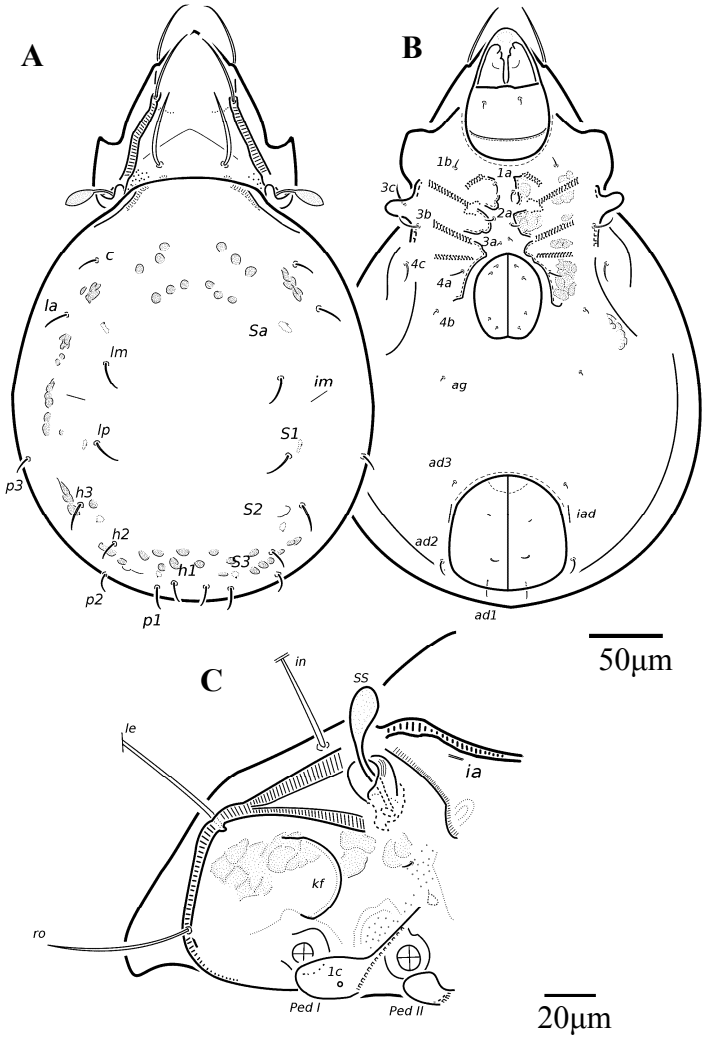

Figure 1. Adult of *Hemileius suramericanus* (Hammer, 1958). A. Dorsal view of body; B. Ventral view of body; C. Prodorsum in lateral view.

Knowing distribution. Semicosmopolitan; Neotropical region: Argentina, Bolivia, Galapagos Islands (Schatz 1998), Uruguay (Altesor *et al.* 2006) and Holarctic region (Subías 2004).
Material. Argentina, Buenos Aires, Mar Chiquita district (Nahuel Rucá farm 37° 37' 10.35" S, 57° 25' 18.34" W), 10 specimens (5 males and 5 females) (MACN-Ar 31440). Specimens were preserved in alcohol. The specimens will be kept in the Museo Argentino de Ciencias Naturales (MACN), Buenos Aires, Argentina.

Discussion

This paper represents the first redescription of *H. suramericanus*, providing the first SEM images and a complete description of gnathosoma and leg setation.

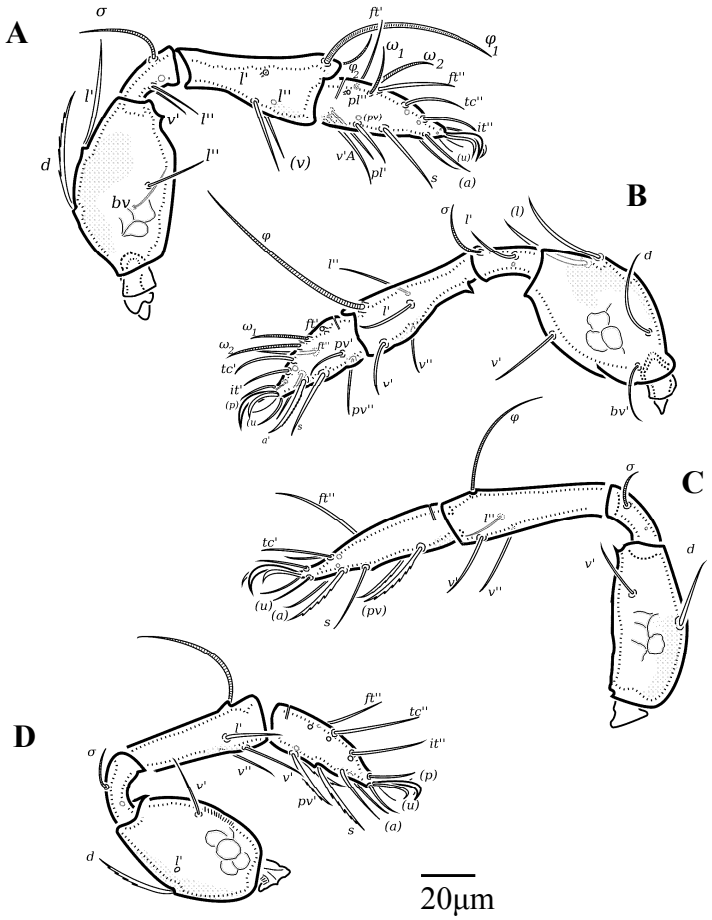

Figure 2. Legs of adults of *Hemileius suramericanus* (Hammer, 1958). A. Leg I right, antiaxial aspect; B. Leg II left, antiaxial aspect; C. Leg IV right, antiaxial aspect; D. Leg III left, antiaxial aspect.

From the revision of bibliographic material of all Neotropical species of *Hemileius*, we noted a higher resemblances among *H. suramericanus*, *H. confundatus sensu* Hammer (1961) and *H. laticlava*. In the following paragraphs, we summarize the knowledge of these species, and we discuss their similarities.

Hemileius confundatus, considered a junior synonym of *H. initialis* by Subías (2004), was recorded by Hammer from Machu Picchu, Perú (Hammer 1961) and La Serena, Chile (Hammer 1962a). Analyzing the figure provided (Hammer 1961, Fig. 78), *H. confundatus* resembles to *H. suramericanus.* The characteristic sigillae in the anterior and posterior regions of notogaster, and also several pits on the anterior region of the notogaster can be observed, as is described for *H. suramericanus* in the present paper. We consider that *H. confundatus sensu* Hammer could represent a misidentification, and the specimens found by Hammer are actually *H. suramericanus*. Therefore, we proposed to consider *H. confundatus sensu* Hammer (1961, 1962a) as junior synonym of *H. suramericanus*.

Hemileius laticlava, described from material collected in Brazil (Pérez-Iñigo & Baggio 1991), can be distinguished from other *Hemileius* by having sensilla with an enlarged and club-shaped head. Nevertheless, the shape of sensilla of *H. laticlava* illustrated looks like *H. proximus*, (Mahunka & Mahunka-Papp 1995, Fig. 89) and *H. suramericanus* (Hammer 1958, Fig. 80 and Figs. 3A, 3C, 3D of this paper) ones.

Therefore, sensilla club-shape solely does not represents a distinctive characteristic of *H. laticlava*. Beside this argument, three differences can distinguish this species from the type species *H. initialis*: *H. laticlava* has lateral prodorsum epimeric region with sigillae and its carinae *kf* is arched and quite developed (Pérez-Iñigo & Baggio 1991, Figs. 7 & 9). Considering the new morphological details of *H. suramericanus* provided here, taken into account that the hitherto characteristics are also present in it, and in absence of any other distinctive character in *H. laticlava*, we propose to consider *H. laticlava* as junior synonym of *H. suramericanus.*

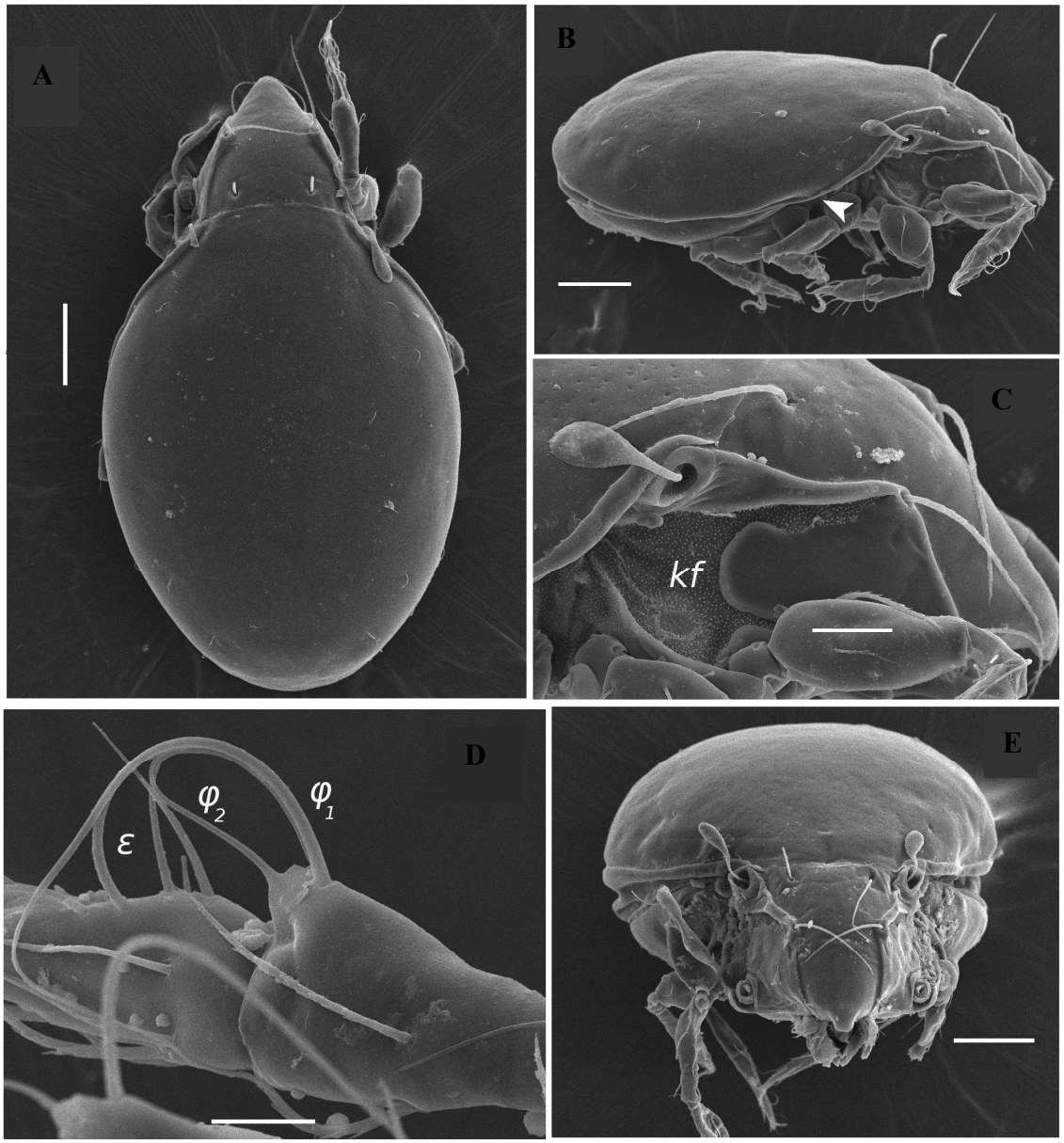

Figure 3. Adults of *Hemileus suramericanus* (Hammer, 1958). A. Dorsal view of body, scale bar = 50 µm; B. Lateral view of body, scale bar = 50 µm; C. Detail of prodorsum in lateral view, scale bar = 20 µm; D. Detail of tibia and tarsus I, scale bar = 10 µm; E. Frontal view, scale bar = 50 µm.

Other Neotropical records of *Hemileius* include: *H. major*, from The Lesser Antilles, *H. muscicola* (Hammer, 1961), from Perú, *H. microclava* (Hammer, 1961),

from Perú and Panamá, *H. trichosus* (Hammer, 1958), from Bolivia, *H. initialis* (Berlese, 1908) and *H. proximus* (Berlese, 1916), from Argentina and Paraguay. The majority of them have very short and simple descriptions that complicate their mutual comparison; however, it is possible to make a brief comparison with *H. suramericanus*.

Hemileius major was characterized by its large size and long interlamellar setae. On lateral view, there is not carinae *kf* but a fully developed lamellar–sublamellar–prolamellar system can also be observed (Mahunka 1985, Fig. 118). This species differs from *H. suramericanus* mainly in its larger body size, the degree of development of the carinae *kf*, strongly reduced in the former, and in the shape of the sublamella, more delicate in *H. major*.

Considering the original description, the most notorious characteristic of *H. trichosus* is its long interlamellar setae, its slimmer sensilla and its size (holotype length = 640 μm), but from the analysis of specimens collected in grassland soils of Buenos Aires, new distinctive characteristics arise. First, *H. trichosus* has a hardly discernible sublamellar ridge that runs from the region above setae *ex* to the middle of lamella. The ratio of length of interlamellar setae against length of prodorsum, a character remarked by Hammer, is about 0.9 in *H. trichosus* and only 0.4 in *H. suramericanus*. Secondly, *H. trichosus* is larger species (female 635 μm (n= 1) and male 530 μm (n= 1)).

According to Grandjean's redescription (1953), *H. initialis* differs from *H. suramericanus* by having on lateral view, a short and poorly developed carinae *kf* and a conspicuous porose area *Al;* on femora of all legs *H. suramericanus* has sigillae (Figs. 3A-D) and on genua IV it has only one seta (seta *l″* is absent). The notogaster of *H. initialis* is smooth (Grandjean 1953, Fig. 1), whereas *H. suramericanus* presents a sort of sigillae in anterior and posterior region of it.

The data about *H. muscicola* and *H. microclava* are insufficient and redundant, but we can distinguished from *H. suramericanus* mainly because both do not have notogastral setae and the shape of the sensilla is quite remarkable, similar to the typical sensilla found in several species of *Scheloribates.*

Finally, *Hemileius proximus*, as Pérez-Iñigo (1984) already pointed out, represents a poorly known species. Mahunka & Mahunka-Papp (1995) observed Berlese's material, but they could not certainly affirm that this specimen belongs to *Hemileius*. Until the identity of this species be confirmed we suggest referring it as *species inquirenda.*

Conclusion

Considering the arguments present above, the synonymy list of *H. suramericanus* is as follows:
Hemileius suramericanus (Hammer, 1958)
Oribatula (?*Hemileius*) *suramericana* Hammer, 1958
Scheloribates confundatus Sellnick, 1928: in Hammer (1961, 1962a) **syn. nov.**
Hemileius suramericanus: in Balogh & Csiszár (1963)
Hemileius laticlava Pérez-Iñigo & Baggio, 1991 **syn. nov.**

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بازتوصیف *Hemileius suramericanus* (Acari, Oribatida, Scheloribatidae) همراه با تفسیرهایی در مورد گونه‌های هم‌جنس نئوتروپیکال

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چکیده

مقاله حاضر نخستین بازتوصیف گونهٔ *Hemileius suramericanus* (Hammer, 1958) (Oribatida, Scheloribatidae) را ارایه می‌کند. جزئیات ریخت‌شناسی و کتوتاکسی به توصیف اصلی هامر افزوده می‌شود. این گونه با دیگر گونه‌های نئوتروپیکال جنس *Hemileius* مقایسه و دو مترادف جدید، *H. laticlava* و *H. confundatus sensu* Hammer در نظر گرفته شد.

واژگان کلیدی: ریخت‌شناسی، کتوتاکسی، گونه‌های نئوتروپیکال، آرژانتین، مترادف‌های جدید.

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